Notice of *Ex Parte* Submission

June 11, 2018

Ms. Marlene H. Dortch, Secretary
Secretary
Federal Communications Commission
445 Twelfth Street S.W.
Washington, D.C. 20554

Re: In the matter of Amendment of Parts 2 and 25 of the Commission's Rules to Facilitate the Use of Earth Stations in Motion Communicating with Geostationary Orbit Space Stations in Frequency Bands Allocated to the Fixed Satellite Service, IB Docket No. 17-95

Dear Ms. Dortch:

The Global Mobile Suppliers Association (GSA)[1] is submitting this *ex parte* letter in the above-captioned proceeding, to address an *ex parte* submission from Viasat.[2] Viasat makes several references to previously filed comments and analyses by GSA and/or its member companies. Viasat misrepresents those comments, and we are filing to correct the record.

1) Statistical vs deterministic analyses – Each type of analysis has its own merits and limitations and needs to be considered in the context of the problem under analysis. In general, when stations of the interfering system are mobile and their exact locations vary randomly with time, a statistical analysis in the form of a Monte-Carlo simulation is needed to extract statistics regarding interference. In order to do this, sufficient information about system characteristics are needed to perform a realistic study. Statistical analyses, therefore, have been extensively used to model mobile cellular systems due to randomness of user locations, base station antenna orientation, propagation effects in urban areas, etc. Such statistical analyses do not add much value to understanding of interference in cases where there is little randomness or variation, or the cases where detailed information of the interfering system are not available. In the case of ESIMs, we note the following:

   Aerial ESIM: Airports are important targets for 5G deployments, either for providing enhanced mobile broadband connectivity to users or for use by airport facilities for all 5G

[1] GSA: Global mobile Suppliers Association. Website http://www.gsacom.com.
[2] Viasat *ex parte* submission dated March 23, 2018.

usage scenarios. For the cases -which present the most challenging interference scenarios (i.e. ESIM on airplanes at an airport) there would be only a limited number of interferers with limited movement. This is a very different situation from one considering mobile users connecting to a cellular network. While simulating movement of planes around an airport is possible, though complicated, we do not expect much difference in the outcome of such a statistical analysis, due to factors mentioned above, as compared with a simple deterministic calculation of specific scenarios.

Maritime ESIM: A similar situation as in aerial ESIM exists for ESIMs on board ships near ports and marinas.

Land ESIM: The case of land-based ESIM (e.g. on trucks or trains) is different. These systems could be temporarily stationary, or could move around quite considerably with significant differences in speed, changing orientation in a mix of urban, suburban, and rural areas. We believe the correct way of analyzing interference from land-based ESIM is through a statistical analysis. However, detailed system operational information and deployment related parameters such as power control have not been submitted into the record and are not otherwise available. It should be noted that GSA, in its comments and reply comments, requested that ESIM operators submit deployment and operational details into the record, but this information has not been provided to date. Consequently, GSA cannot refine its simulation assumptions and analysis. If and when such information becomes available from ESIM operators, GSA could undertake a statistical study to analyze the impact of interference from land ESIM on 5G operations.

2) ESIM OOBE modeling – Viasat has questioned the source of the values GSA used to model OOBE of ESIMs. GSA's calculation of interference from ESIM operation in adjacent channels was based on FCC Part 25.202(f) to derive an Adjacent Channel Leakage Ratio (ACLR) in adjacent channels. The values obtained (25, 35, and 46.5 dB) were used in our calculations, together with other parameters provided.

3) Viasat seems to misinterpret 'inf' entries in our results table. A key issue for the harmful interference cases (ESIM into MS) in our reply comment is related to the fact that out-of-band emissions of ESIM are assumed in the form of a constant ACLR value beyond 250% bandwidth. In some cases, this constant ACLR value results in situations in which no amount of frequency separation provides adequate protection of the mobile station. In the GSA summary results table, this result is represented with marking separation distance for such cases with 'inf'. These 'inf' entries are artifacts of how OOBE masks are normally expressed, i.e. using flat segments. It is important, therefore, that the study results for those scenarios are not misinterpreted as requiring infinite separation distance, but simply a result of the fact that no separation distance could be calculated given the assumed OOBE mask based on Part 25.202(f).

4) Terrestrial Mobile Service protection criteria – GSA notes that I/N protection criterion for the terrestrial Mobile Service as defined in ITU-R is not associated with a percentage of

time, location, or cases, and should be considered as instantaneous. Therefore, GSA is of the view that Viasat's use of percentages of exceedance of I/N does not paint a full picture of protection of 5G systems.

5) Other comments – We note that some of the 5G parameters used in the Viasat ex parte are not in line with parameters the US has agreed and submitted to ITU-R including bandwidth (60 MHz instead of 100 MHz), noise figure (6.5 dB for user device instead of 8.5 dB) and antenna gain. Correcting these values would impact the outcome of their study.
   The way Viasat has modeled land ESIMs moving in an urban area using buildings is extremely dependent on the specifics of the urban area analyzed. It is possible to choose an area that would show few instances of interference solely because the vast majority of simulation sample points are blocked by buildings. This raises questions regarding the validity of the percentage availability calculations as the availability becomes more of a "duty cycle of potential interference exposure" calculation based on a moving vehicle sampled along its driving path rather than actual interference analysis. But the land ESIM path relative to terrestrial mobile deployments is a random "hit or miss" and one could get a wide range of availability values by choosing a different land ESIM path, speed, and other parameters. For example, if one started and ended the ESIM movement path only where there is line of sight, the availability results would probably become much worse, showing significant interference.

   The notional channel plan shown in Figure 3 presents the lower baudrate ESIM carriers having sharper roll off closer to the 5G spectrum and higher baudrate ESIM carriers having gradual roll off farther away from the 5G band, with around 20 dB difference in emissions into 5G band. This representation of the channel plan is not binding and in practice larger baudrate carriers could be deployed anywhere in the band. The study does not cover such cases.It is not clear if Viasat is advocating the notional channel plan to be mandated by FCC rules:absent this channel plan specificity in the rules, the range of interference possibilities cannot be reasonably limited.

Conclusions:

As noted in both our comments (July 2017) and reply comments (August 2017), GSA is still ready to provide additional analyses, including statistical simulations, once it receives detailed information on the operation of ESIM transmissions. However, this information--critical to performing an accurate and detailed study—has not been provided to the record after almost a year. GSA remains concerned about the potential for unacceptable adjacent-band interference for certain airborne and maritime deployment scenarios in proximity cases. Land-based ESIM pose even greater concerns due to the high likelihood for extensive and prolonged operation in close proximity to 5G systems. As stated in our filings in 2017, GSA is of the view that mobile systems in the 27.5-28.35 GHz band are entitled to protection from adjacent channel ESIM emissions.

Respectfully Submitted,

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